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(54) IMPROVEMENTS IN OR RELATING TO ELASTIC FOAMED MATERIALS AND PROCESSES OF PREPARING THEM

(71) We, TARKETT AB, a company duly organized and existing under the laws of Sweden, of 370 14 Ronnebyhamn, Sweden, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to an elastic soft foamed material and a process of preparing it.

In conventional preparation of elastic soft foamed materials, crystalline calcite or dolomite as filler is mixed with the basic material, which may be caoutchouc latices, plastic dispersions, soft polyurethane adducts, PVC plastisols etc., and with the requisite additions, whereupon the composition is expanded, that is, whisked or foamed, until the desired density has been obtained. By increasing the filler content and the expansion it is possible to reduce the cost of the product, which will, however, impair the strength properties of the product. Quality requirements therefore put a limit to these measures.

Since a couple of years, small gas-filled hollow spheres of alumina silicate, so-called microspheres, are available on the market, these microspheres being a constituent part of so-called fly-ash, which is obtained from certain coal-fired power plants. The microspheres are defined for the purposes of this specification as having sizes of about 20—300 microns, a wall thickness of between 3 and 5 microns and a volume weight of 0.3—0.7 g/cm³. The microspheres have been used as weight lowering agents in curable plastic compositions, concrete, etc.

The object of the present invention is to improve, with the aid of said microspheres, the prior art types of elastic soft foamed materials.

According to one aspect of the invention there is provided an elastic foamed material consisting essentially of one or more of natural or synthetic rubber latices, plastic dispersions and polyurethane, together with gas filled hollow microspheres (as herein defined) of aluminium silicate, the material being formed with hollow cells produced by expansion of the material.

According to another aspect of the invention there is provided a process of preparing material as set out in the preceding paragraph, comprising mixing gas filled hollow microspheres (as herein defined) of aluminium silicate with a liquid of one or more of natural or synthetic rubber latices, plastic dispersions and polyurethane and whisking the composition to the desired density.

The invention will be more fully described hereinbelow and with reference to the following Examples which relate to the preparation of a latex composition in the previously known manner and according to the new process, as well as to the preparation of polyvinyl chloride plastisols for mechanical foaming in the previously known manner and according to the new process.

EXAMPLE 1

Preparation of a latex composition in the previously known manner (recipe A) and according to the new process (recipe B), all parts being given by weight.

Example of Latex Composition	Recipe A	Recipe B
Artifificial caoutchouc latex (67 percent dry solids content)	100	100
Vulcanizing paste (40 percent dry solids content)	55	55
Natural caoutchouc latex (60 percent dry solids content)	115	115
Crystalline filler	135	—
Microspheres as defined above, ceramic	—	100
	405	370
Foamed to g/liter	380	230

The composition is continuously fed to a Eur-O-Matic type foaming machine, in which air is mechanically whisked into the composition. Recipe B which contains spheres of a density of about 0.6 g/cm³, yields, after the same amount of air has been whisked in as in recipe A, a foam which is about 150 g lighter per liter.

The foam is supplied to a coating machine, in which the foam is applied with the aid of a roll or doctor blade to a web, for instance a textile carpet. The web with the foam is moved for vulcanisation through ovens having a temperature of about 150°C.

When tested, the foamed material thus prepared proved to have far better mechanical properties, for instance a higher delamination strength.

The quantity of microspheres added may vary and amounts to a maximum of about 60 percent by weight.

EXAMPLE 2

Preparation of PVC plastisols for mechanical foaming in the previously known manner (recipe A) and according to the new process (recipe B), all parts being given by weight.

Examples of Polyvinyl Chlorine Plastisols For Mechanical Foaming

	Recipe A	Recipe B
Polyvinyl chloride plastisol	100	100
Plasticizer	60	60
Stabilizer	2	2
Foam emulsifier	4	4
Crystalline filler, for instance calcite	20	—
Microspheres as defined above, ceramic	—	20
	186	186
Foamed to g/liter	500	425

The plastisol is continuously fed into a Eur-O-Matic or Oakes (Registered Trade Mark) type foaming machine. In this machine air can be whisked into the polyvinyl chloride plastisols because of the existence of foam emulsifiers in the composition. These emulsifiers can be soap or silicon type emulsifiers.

Depending upon the formulation of the composition and the amount of air added it is possible to obtain a lighter or a heavier foam. Recipe A includes a normally crystalline filler (density of about 2.6 g/cm³) while recipe B contains microspheres. Because of the lower density of the microspheres (about 0.6 g/cm³) recipe B, after whisking with the same amount of air as in recipe A, yields a foam which is about 75 g/liter lighter than the calcite-containing foam according to recipe A.

The mechanical strength of a foam is dependent int. al. on the volume weight and the employed volume of filler. Although the fill volume is higher for the foam containing microspheres the delamination strength of this foam is twice that of a foam having calcite as filler. The admixture of microsphere thus gives a foam of superior mechanical properties.

The quantity of microspheres added may vary and in the present example may amount to a maximum of about 50 percent calculated on the total weight of the composition.

WHAT WE CLAIM IS:—

1. An elastic foamed material consisting essentially of one or more of natural or synthetic rubber latices, plastic dispersions and polyurethane, together with gas filled hollow microspheres (as herein defined) of aluminium silicate, the material being foarmed with hollow cells produced by expansion of the material.

2. A material as claimed in claim 1 wherein the dispersion comprises polyvinyl chloride plastisol.

3. A process of preparing the material as claimed in claim 1 or claim 2 comprising mixing gas filled hollow microspheres (as herein defined) of aluminium silicate with a liquid of one or more of natural or synthetic rubber latices, plastic dispersions and polyurethane and whisking the composition to the desired density.

4. A material as claimed in claim 1 substantially as herein described.

5. A process as claimed in claim 3 substantially as herein described with reference to either of the examples.

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